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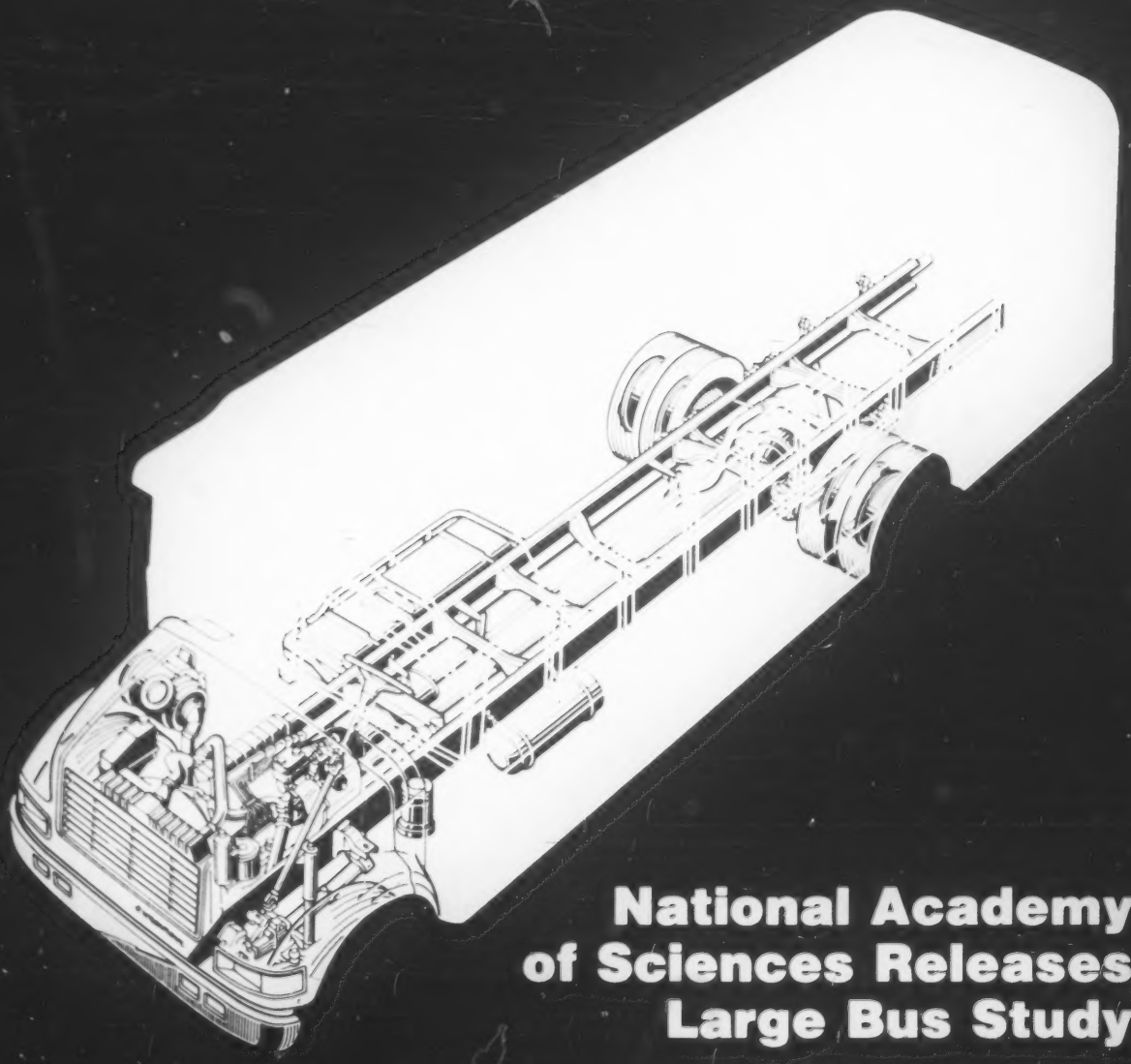
SCHOOL BUS®

MANAGEMENT & MAINTENANCE OF PUBLIC & PRIVATE PUPIL TRANSPORTATION FLEETS



National Academy of Sciences Releases Large Bus Study

The State of Private Contracting

SBF's Aftermarket Study

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SCHOOL BUS FLEET

MANAGEMENT & MAINTENANCE OF PUBLIC & PRIVATE PUPIL TRANSPORTATION FLEETS

Vol. 35 No. 3

June / July 1989

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Frank Cyr *30*

Crown *60*

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EDITORIAL AWARD
JESSE H. NEAL CERTIFICATE, 1985

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Congressionally Ordered School Bus Study Released

Research Council study concludes alternate safety measures may be better than seat belts on school buses; Council urges replacement of pre-77 school buses.

"The overall potential benefit of requiring seat belts in school buses is insufficient to justify a federal standard mandating installation," the National Research Council committee concluded. In an 18-month study of the effectiveness of safety measures on school buses, the committee examined a variety of safety measures and the cost effectiveness of each measure.

To conduct the study, the NRC, the operating arm of the National Academies of Sciences and Engineering, assembled a committee of experts in highway safety, pediatrics, school transportation, bus manufacturers, occupant-restraint systems, and public policy analysis.

What follows is a verbatim transcript of the executive summary of the report. The editors of SCHOOL BUS FLEET *will present additional portions in coming issues.*

Each year in the United States 10 children on average are killed while riding to and from school or school-sponsored activities in large, "Type I" school buses — buses with gross vehicle weight ratings (GVWRs) greater than 10,000 lb. — which make up 80 to 85 percent of the nation's school bus fleet. Another 2 children are killed while riding in other vehicles used as school buses, and 38 children are killed in loading zones around school buses. In addition, about 480 children are seriously injured while riding in school buses, and 160 are seriously injured while boarding or leaving school buses.[1]

Although the death or injury of any child transported by school bus is a cause for concern, the safety record of school buses is good considering the amount of travel involved. In a typical year, the nation's 390,000 school buses travel nearly 4 billion mi. to transport 25 million children to and from school or various school-sponsored activities. Even though school buses transport more passengers per trip, the rate of occupant fatalities per mile driven for school buses is about one-fourth that for passenger cars.[2] Nevertheless, the public expects that the federal and state governments, as well as local school districts and private school bus contractors, will continually review the safety of school bus transportation and take all reasonable precautions to protect children who travel by school bus.

Proposed Safety Methods & Their Effectiveness in Reducing Deaths & Injuries

Seat belts	0-20%
Higher seat backs	0-20
School bus monitors	25-75
Crossing control arms	5-25
Electronic sensors	10-50
Mechanical sensors	10-50
Stop signal arms	0-30
External loud speaker systems	0-20
Pupil education programs	0-20

Effective April 1, 1977, the National Highway Traffic Safety Administration (NHTSA) issued three new federal motor vehicle safety standards and modified four others to enhance the safety of school bus transportation. For post-1977 school buses (i.e., buses manufactured after April 1, 1977) with GVWRs of 10,000 lb. or less, these standards require that passenger seats be equipped with seat belts (i.e., lap belts). For the more common Type I school buses with GVWR's greater than 10,000 lb., the standards do not require seat belts, but instead rely on strong, well-padded, energy-absorbing seats and higher seat backs to "compartmentalize" and protect passengers during a crash. NHTSA concluded that the compartmentalization requirements are adequate and that seat belts are not warranted on the larger school buses.

Other individuals and organizations, however, argue that seat belts are warranted on all school buses and that they should be installed at the time of manufacture. In the last several years a number of school districts, and one state (New York), have begun ordering seat belts as standard equipment on all new school buses.

The continuing debate over seat belts on school buses led to a provision in the Surface Transportation and Uniform Relocation Assistance Act of 1987 requesting that the National Academy of Sciences examine the causes of school bus accidents and evaluate the effectiveness of safety measures, including seat belts, that might better protect children while they are boarding, riding, and leaving school buses.

Post-1977 school buses

The committee believes that the standards issued by NHTSA in 1977 have substantially improved the crashworthiness of school buses and have made a mode of transportation that was already quite safe even safer. All states, local school districts, and private contractors that are still operating pre-1977 school buses should replace these vehicles with post-1977 school buses as rapidly as possible. Private organizations such as church groups that purchase and operate used, pre-1977 school buses should be informed that these buses do not meet current standards for newly manufactured buses and that they should rigorously maintain these vehicles and provide safety instruction, including evacuation, for all passengers.

Seat belts

If all large, Type I school buses operated in the United States were equipped with seat belts, one life might be saved and several dozen serious injuries avoided each year. On the basis of this estimate, the committee concludes that the overall potential benefit of requiring seat belts in large school buses is insufficient to justify a federal standard mandating installation. The funds used to purchase and maintain seat belts in the nation's fleet of school buses—more than $40 million/yr.—might better be spent on other school bus safety programs and devices to save more lives and reduce more injuries.

Most members of the committee believe, therefore, that states and local school districts should not be encouraged to equip new buses with seat belts. Nevertheless, some members believe that a uniform occupant-restraint policy for all motor vehicles is important enough that states and local school districts should be encouraged to equip new school buses with seat belts.

States and local school districts that choose to require seat belts in buses must ensure that all school bus passengers wear them and wear them correctly. Any program to require the use of seat belts on school buses can be effective only if it has the support of the school board, school administrators, teachers, parents, and school bus drivers.

Finally, retrofitting any large school bus with seat belts can present problems. On pre-1977 school buses, seat belts used in conjunction with the lower, less-padded seat backs typical of those buses might actually increase the severity of injuries. Consequently, seat belts should *not* be installed on buses that were manufactured before April 1, 1977. For post-1977 buses, retrofitting with seat belts is more complicated and costly than installing seat belts at the factory as original equipment, and therefore is generally not recommended.

Other measures to improve the safety of school bus passengers during crashes

Besides seat belts, a variety of other programs and devices that are available might better protect school bus passengers during crashes. Although it is not possible to rigorously quantify the safety benefits of these measures, the committee believes that two safety measures merit immediate action, and several others are worthy of further research, development, and evaluation.

• *Prohibit standees.* If the school bus safety standards issued by NHTSA are to be effective in reducing injuries, all passengers must be properly seated. Passengers who are out of position during a school bus crash may sustain unnecessary injuries while endangering others as they are thrown about inside the passenger compartment. The committee recommends that all states prohibit standees on school buses operated by or for public or private schools.

• *Higher seat backs.* Raising the minimum height of school bus seat backs from 20 to 24 in. [as measured from the seating reference point (SRP)] would provide passengers with added crash protection, particularly for the head, at little added cost to the purchase price of a school bus. Concerns have been raised about possible interference of higher seat backs with a driver's ability to monitor student behavior and about possible noncompliance with an existing standard that addresses window emergency exits. However, two states now require higher seat backs and

Annual Costs for Nationwide Use and Reductions in Fatalities and Injuries

Safety Measure	Effectiveness[a]	Annual Cost ($ millions)[b]	Lives Saved	Injuries Prevented		
				Incapacitating	Nonincapacitating	Possible
Seat belts[c]	0–20	43	0–1.0	0–48	0–238	0–665
Higher seat backs	0–20	6	0–2.4	0–95	0–475	0–1,330
School bus monitors	25–75	1,900	12.5–37.5	159–478	655–1,964	1,763–5,290
Crossing control arms	5–25	15	0.8–4.0	2–9	3–14	5–24
Electronic sensors	10–50	91	2.4–12.0	6–29	9–43	14–71
Mechanical sensors	10–50	131	2.4–12.0	6–29	9–43	14–71
Stop signal arms	0–30	5	0–1.5	0–14	0–21	0–35
External loud speaker systems	0–20	11	0–2.4	0–21	0–32	0–52
Pupil education programs	0–20	14	0–6.3	0–28	0–42	0–69

[a] Percent reduction in deaths and injuries of target populations given in Table 6-1.

[b] For stop signal arms, the data in this table assume that 56 percent of the nation's school bus fleet is already equipped. For other measures, current use is low enough to disregard.

[c] Fifty percent use rate assumed.

SOURCE: Fatal Accident Reporting System

report no operational problems or difficulty in complying with the NHTSA standard governing emergency exists. The committee believes that any problems associated with higher seat backs can be overcome and that NHTSA should revise its standards to require that school bus seat backs be at least 24 in. above the SRP.

In addition to the standard lap belts that are currently being used in school buses in a number of school districts in the United States, three other seat and restraint systems were considered: lap bars, lap and shoulder belts, and higher-backed rear-facing seats with lap belts. It is too soon to recommend any of these systems for general use; additional research and testing are needed.

To enhance and extend the structural integrity of school bus bodies, the committee recommends that NHTSA further study the feasibility of (a) improving the perimetric structure of school buses for greater side-impact protection and (b) making various body components, such as ventilation spaces and access panels, less hazardous during crashes.

Finally, to make school buses more visible and avoid nighttime accidents, NHTSA should consider the potential cost and safety effectiveness of using reflective materials on school buses and determine if minimum standards for the use of such materials are warranted.

Measures to improve the safety of school bus passengers after crashes

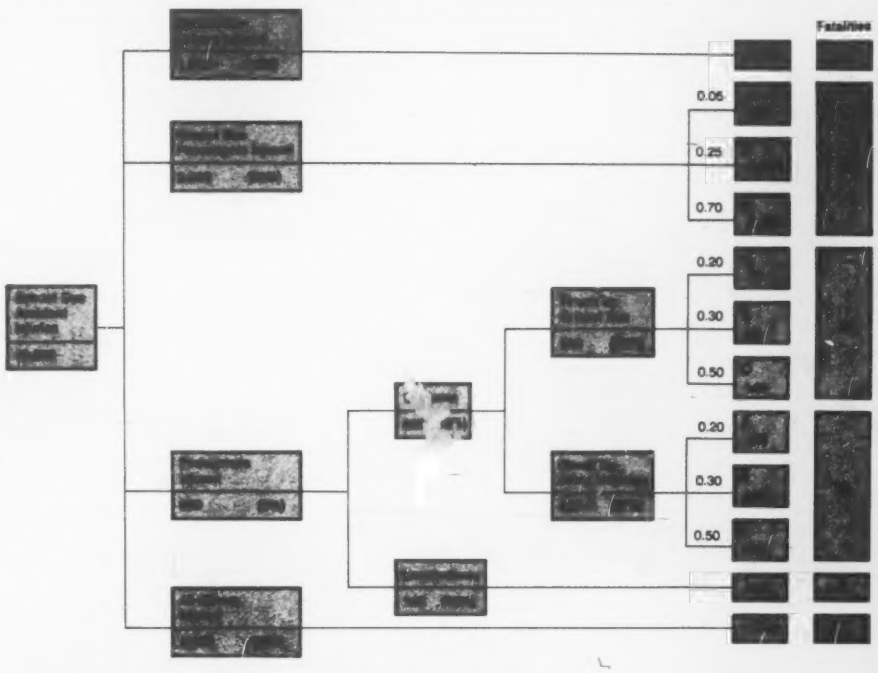
Post-crash fires in school bus accidents are rare. No evidence was found that any *school* bus accident fatalities resulted from fire or smoke inhalation during the study. Nevertheless, the *church* bus crash and fire in Carrollton, Kentucky, May 14, 1988, that involved a pre-1977 bus and resulted in the deaths of 27 bus occupants serves as a grim reminder that post-crash fires can and do occur in bus accidents. Partly as a result of the Carrollton crash, both industry and government are considering measures that might make fuel systems on school buses safer (relocating the fuel tank, substituting diesel engines for gasoline engines, etc.).

Research is also progressing in the development of new materials that have the energy-absorption characteristics that are necessary for school bus seats and at the same time are fire resistant or fire retardant.

NHTSA should monitor this research to determine if and when these new materials should be required in school bus construction by federal standards for school bus construction.

NHTSA should reconsider the minimum number of emergency exits that are required on school buses. Under current standards, the number of emergency exits on school buses is independent of seating capacity. School buses with higher seating capacities should have more emergency exits. In addition, NHTSA should prohibit the

Annual Fatalities and Injuries in School Bus Accidents



This chart shows the 19,000 school bus accident injuries and 149 fatalities that occur each year in the United States. Of the injuries and 149 fatalities, only 35% occurred after being struck by a school bus.

SOURCE: Fatal Accident Reporting System

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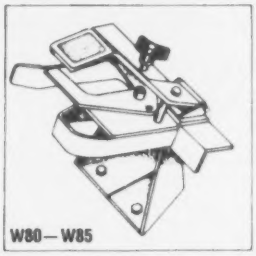

W80—W85

The new W85 has the same features as W80 plus:

- ☐ New wider clamping jaw to accommodate even wider wheels
- ☐ New jaw width is 3½" versus 2¾"
- ☐ Height of 13½"
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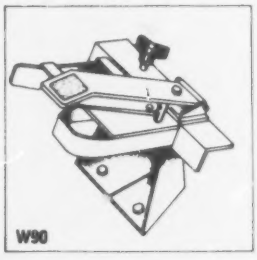

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installation of seats that obstruct emergency doors.

Measures to improve the safety of children in school bus loading zone

School bus accident data show that children are at a greater risk of being killed as pedestrians in school bus loading zones than as passengers on school buses. Of the 38 children killed each year in loading zones around school buses, two-thirds are struck by school buses. A larger share of school bus safety efforts should be directed to the loading zone.

Of the several safety programs and devices proposed to reduce the number of deaths and injuries in school bus loading zones, five should receive immediate attention. Others merit additional field testing and evaluation.

• *School bus driver training.* The requirements for school bus driver training vary considerably among the states; for example, some states do not require school bus drivers to be trained in school bus operation or pupil management before transporting children to and from school. The committee recommends that all states establish minimum criteria for school bus driver training and that all drivers receive training before transporting children.

• *Stop signal arms.* Currently, 28 states require the use of stop signal arms—stop signs with flashing red lights that extend from the left side of the school bus when it stops to load or unload students. Evaluations of this device have demonstrated its effectiveness in stopping other traffic at school bus stops. The committee recommends that NHTSA require installation of stop signal arms on all new school buses and that states and local school districts consider retrofitting older buses with stop signal arms.

• *School bus routing.* The basic principles of school bus routing are well known. These principles should be consciously applied and should not be sacrificed for operational efficiency, student convenience, or political expediency. States and local school districts should review their school bus routes annually and take all practical measures to ensure that the routes have been safely planned and are being followed as intended.

• *Pedestrian safety education.* States and local school districts are encouraged to provide behavior-based pedestrian safety education programs to children in grades K through 6. These programs should stress safe and appropriate behavior in school bus loading zones. NHTSA should complete the development of its pedestrian education program and assist the states and local school districts in their efforts to provide instruction in pedestrian safety.

• *Cross-view mirrors.* By federal standard all new school buses must be equipped with a mirror that provides the driver a view of the road immediately in front of the bus. NHTSA should reexamine this standard to determine if current specifications for mirrors can be modified to give the driver a better view of the area in front of and immediately beside the bus.

Other measures to prevent children from being

struck by their own school buses are in various stages of development. Electronic and mechanical devices to detect the presence of a child near the bus have recently come on the market. Crossing control arms that force children to cross far enough in front of the bus so that they can be seen by the driver are also now available as an option on school buses. These devices should be field tested and evaluated by NHTSA as well as by states and local school districts.

To prevent children from being struck by other vehicles in school bus loading zones, the committee recommends that states field test and evaluate the California practice of requiring the school bus driver to escort the children in grades K through 8 across the street or highway when they leave a school bus. Similarly, states and local school districts are encouraged to field test external loud speaker systems that allow the driver to communicate with children who have left the bus and tell then when it is safe to cross a street or highway.

Other findings and recommendations

A number of the recommendations call for field testing and evaluating different school bus safety devices (e.g., with external loud speaker systems) or retaining some measures (e.g., seat belts) as options for states and local jurisdictions. Although these recommendations may encourage additional variability in the construction of school buses, the committee urges the states, in cooperation with NHTSA, to work toward more universally acceptable standards for school bus construction and equipment. Nonuniformity of standards among states adds to the cost of each school bus sold and makes the purchase of newer, safer buses more expensive.

Finally, the study was seriously hampered by a lack of reliable and valid school bus accident data and a dearth of information on the effectiveness of potential school bus safety programs and devices. The committee recommends that NHTSA work with the states, and other interested organizations, to upgrade and standardize school bus accident data collected by the states. As the quality of school bus accident data improves, these data should be used to better define why and how children are being injured in school bus accidents and to evaluate the effectiveness of various school bus safety programs and devices in reducing the number of accidents, deaths, and injuries.

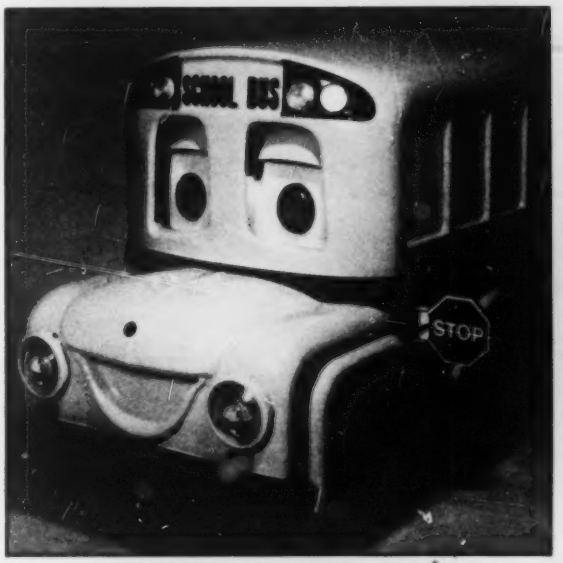
Notes

1. The term *serious injury* as used in this report refers to "incapacitating" injuries that range from severe lacerations or broken limbs to quadriplegia or coma (see Chapter 3). Serious injuries are not necessarily life-threatening and most do not result in permanent disability.

2. The safety record of school buses reflects, in part, the larger size and higher center of gravity of school buses as well as safer operating conditions (e.g., more travel on weekdays during daylight hours) when compared with passenger cars.

Teach School Bus Safety More Effectively With

BUSTER the SCHOOL BUS



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Aftermarket Study Reveals Industry Maturation

Brand preference has come to play a greater role in buying and specifying throughout pupil transportation; the trend toward diesel use continues to grow.

Nearly half the school buses nationwide are now diesel fueled. Brand preference is playing an increasingly greater role in the industry's buying and specifying decisions.

These are two findings to come from the just completed *SCHOOL BUS FLEET* Aftermarket Study. Conducted by the editors of the magazine, the study randomly surveyed 500 readers who operate district- and contractor-owned school bus fleets, in proportion to their readership of the magazine.

There are two portions to the study. The larger segment, representing 400 names, was sent to both district and contractor subscribers. It generated a 28 percent response overall. The smaller segment, directed exclusively to directors of pupil transportation, generated a 49 percent response. This methodology ensures a representative sample of the industry.

This study continues a series of marketing and maintenance studies of the pupil transportation industry that the editors conducted in 1983, 1985 and 1987. Findings reported here will be compared with the earlier results where the question and sample size are comparable.

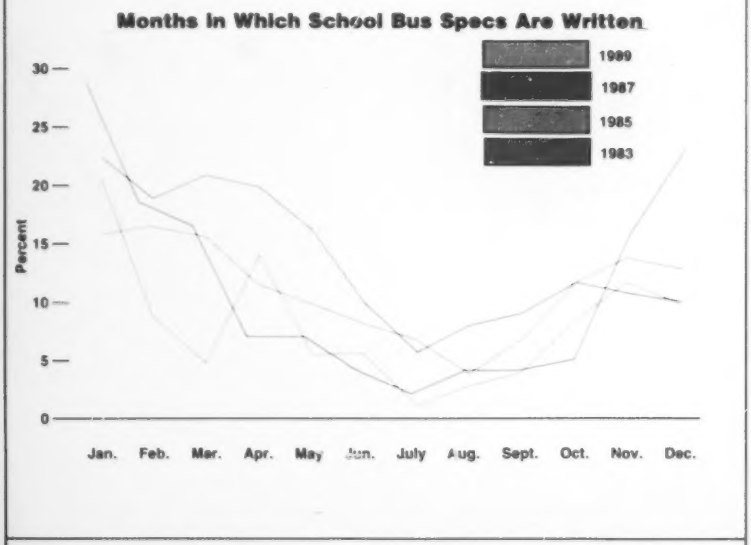

Chart A: School bus specifications writing continues to move forward in the school year. The key months are now November, December and January. When *SCHOOL BUS FLEET* first asked this question in 1983, most specifications were written in the months of February, March and April.

Fleet Size

Respondents reported owning and operating a total of 9,470 school buses. Seventy five percent of these were conventionals, 11 percent transit-style and the remainder small vans.

Of the vehicles reported, transit buses are replaced every 12 years with an average of 214,218 miles of use. Conventional school buses are replaced every 11 years with an average of 145,292 miles of use; meanwhile, small vans are replaced after 9.5 years with 132,050 miles of use. These findings are consistent with earlier survey results.

Of the 159 fleets reported in the survey, districts reported an average of 62 buses each while contractors reported an average of 55 buses each.

Specifications

Among the most important findings is a confirmation of a trend first identified in 1985. The industry continues to move its bus specification writing toward the beginning of the school year. As Chart A shows, overall, November, December and January are the prime months in which the industry writes specifications for new school buses.

Six years ago, when this question was first asked, January through March were the most common months for spec'ing. Even two

years ago, the writing activity occurred principally in January, though it was edging toward December.

This trend toward earlier specification writing indicates a continuing maturation of the industry, as operators increasingly buy the year around. Manufacturers constantly seek to shift production year around, too, to avoid the burden of completion and delivery of new school buses exclusively in the late summer months.

Interestingly, the months of November and December are more heavily favored by district fleets, while January seems to be the preferred month among contractor fleets.

While this question answers when school buses are specified, it didn't answer who specifies them. Thus, the study asked pupil transportation directors (this question was directed only to them) two related questions. First, does an individual or a committee prepare the specifications for new school bus purchases? And second, if done by committee, who serves on the committee?

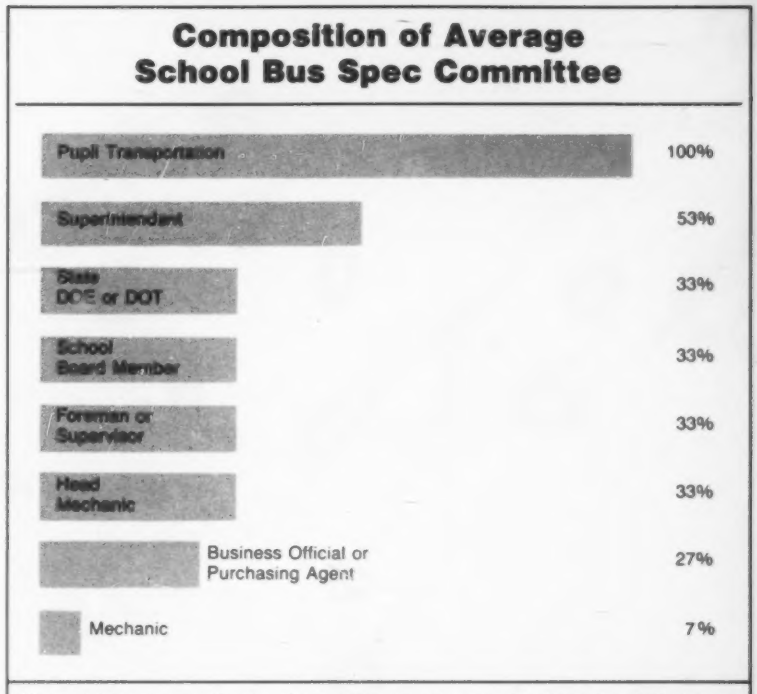

Chart B: When a committee is called to write school bus specifications, the study showed the membership profile of the committee includes these titled individuals. The study showed that committees are called only 35 percent of the time. The remainder of the time the specs are written exclusively by the pupil transportation director.

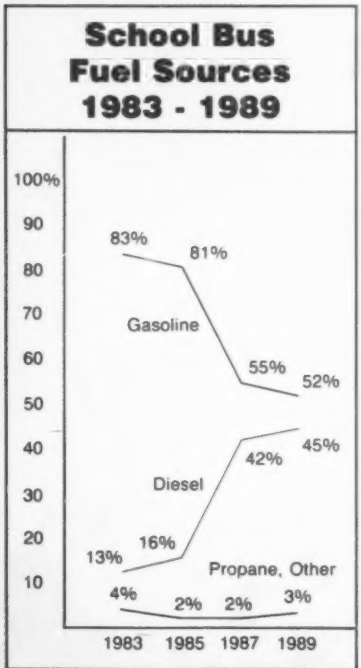

Chart C: Nationwide, the use of diesel fuel in school buses has increased dramatically while the use of gasoline fuel has declined. The phenomenon is partially due to the industry-wide effort to replace pre-1977 school buses.

To the first question, the reply was that an individual wrote the specifications 65 percent of the time, while a committee was relied on 35 percent of the time.

As Chart B shows, for those district-owned fleets that rely on committees for spec writing, the committee is typically composed of several titled individuals. The pupil transportation director serves on the committee all the time; the second most common titled individual is "superintendent" followed by "state DOE or DOT," "head mechanic" and "school board member."

What this means is that the pupil transportation director is the most important specifying influence in the industry; he or she serves in this important role every time, whether in an individual capacity or on the committee.

It is significant that this important responsibility is handled so heavily by staff level individuals industry-wide. An assumption has been made that school board members are more involved in school bus buying decisions; study results do not seem to bear out that assumption.

The study disclosed that only 35 percent of all school district fleets have a mandatory replacement age for their school buses. Meanwhile, 48 percent of all contractors report their company has a mandatory retirement. The mandatory retirement age for both districts and contractors is about 10 years.

Purchasing Responsibility

The editors also asked about purchasing responsibility.

Respondents were asked to check one of the four choices which describe purchasing responsibility: recommend decision, final decision, serve on a committee, and no influence. Overall, 51 percent of all respondents replied they recommend, 31 percent replied they make the final decision and 12 percent serve on a committee; only six percent reported they have no respon-

sibility for school bus purchasing.

Thus, 94 percent of all respondents to the *SCHOOL BUS FLEET* Aftermarket Study have purchasing responsibility for school bus acquisitions.The only shift in practice this question revealed was that in 1983 and 1985, a greater percent — 12 percent and 16 percent respectively — had no purchasing influence at all.

These data indicates that responsibility for bus acquisition clearly is a staff function. It is not a function that is being shunted off onto the school board.

Brand Preference

Survey results showed that brand preference of various products and components continues to increase.

Leading the way is an 18 percent increase in bus body brand preference over the past two years. Now, 71 percent of *SCHOOL BUS FLEET* subscribers report they have a bus body brand preference. When the editors first asked this question in 1983, only 50 percent of respondents said they had a bus brand preference; by 1985 that figure had grown to 60 percent. Clearly, a trend has emerged in this area.

Meanwhile, chassis preference has grown to 73 percent this year from 62 percent in 1985.

To round out this series of questions, the editors added a question about engine brand preference; 74 percent of respondents replied affirmatively.

In addition, the study asked whether respondents have a brand preference about 16 other products, items such as tires, batteries, mirrors, shocks, lights, etc. Of these a majority of respondents replied they have brand preference for only four items — tires, oils and lubricants, brakes and filters.

Since this question was last asked in 1983, brakes and filters have joined the list as products selected in part because of brand preference.

Interestingly, by margins of 12-to-1 and more, most operators reported they purchased most of these 16 items for their fleets within the past 12 months.

This clear movement toward brand preference of the chassis, bus bodies, engines, tires, oils, lubricants, brakes and filters shows the growing influence of product quality, performance, customer service, promotion and advertising. It also suggests that suppliers to the industry will have to work harder in coming years to gain market penetration, for pupil transportation is increasingly an arena in which brand preference is a key factor in the specifying and buying decision.

The move toward brand preference may be reflected in the growing parts budgets of most operators. Respondents were asked to report "the amount your district/company spends annually for parts (excluding oil, fuel and tires)." They reported a whopping 88 percent increase in their parts budgets, since the study last asked this question in 1985.

In the most recent study, respondents overall reported parts bud-

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gets of $59,248, compared to $31,422 four years ago. Districts reported average parts budgets of $70,507 while contractors reported average parts budgets of $42,538.

Alternative Fuels

Another important trend is the continuing movement toward diesel-fueled school buses. Fully 45 percent of the buses are now diesel-fueled while 52 percent of the fleet is gasoline-powered. The accompanying Chart C shows the dramatic growth of diesel fuel throughout pupil transportation over the past six years. When the study first asked this question in 1983, only 16 percent of all school buses were diesel-powered.

It is likely that as the industry continues to replace pre-1977 buses, diesel will be the fuel of choice. Manufacturers uniformly report that they see more and more orders for diesel-powered school buses.

Ironically, as the trend toward diesel fuel takes hold, the federal government and some state governments — notably California — are beginning to encourage the use of alternative fuels such as methanol, ethanol or propane.

According to the current study results, only about three percent of school buses nationwide are fueled by these other fuels; this percentage has remained remarkably consistent during the past several years.

(Editor's note: Ironies abound in the move toward alternative fuels. Diesel fuel was viewed as an alternative to gasoline when it was introduced more than five decades ago. Further, when automobiles had come into popular usage several decades before then, gasoline was viewed as an environmentally clean fuel source. It was hailed as a technological solution to the replacement of the environmentally unsound, to say nothing of unsightly, mountains of horse manure produced by the principal motive sources of those days—horses—which littered the nation's urban centers at the turn of the century.)

Other findings include:

- The usage of engine and transmission lubricating oil is on the upswing. Overall survey respondents reported using 1,270 gallons per fleet, a 30 percent increase over 1987 usage. Interestingly, district fleets report using nearly two-and-a-half times as much of this product as contractors do.
- More than half, 53 percent, of the nation's school buses are equipped with automatic transmissions; 47 percent are equipped with manual transmissions.
- Overall, the average fleet reported spending $21,138 annually for the purchase of new tires and $5,244 annually to lease tires.

The editors of *SCHOOL BUS FLEET* plan to conduct this study again two years hence. In the meantime, the survey clearly shows trends toward specification writing earlier in the school year, brand preference, increased parts budgets, increased use of lubricating oil and a continuing move toward dieselization.

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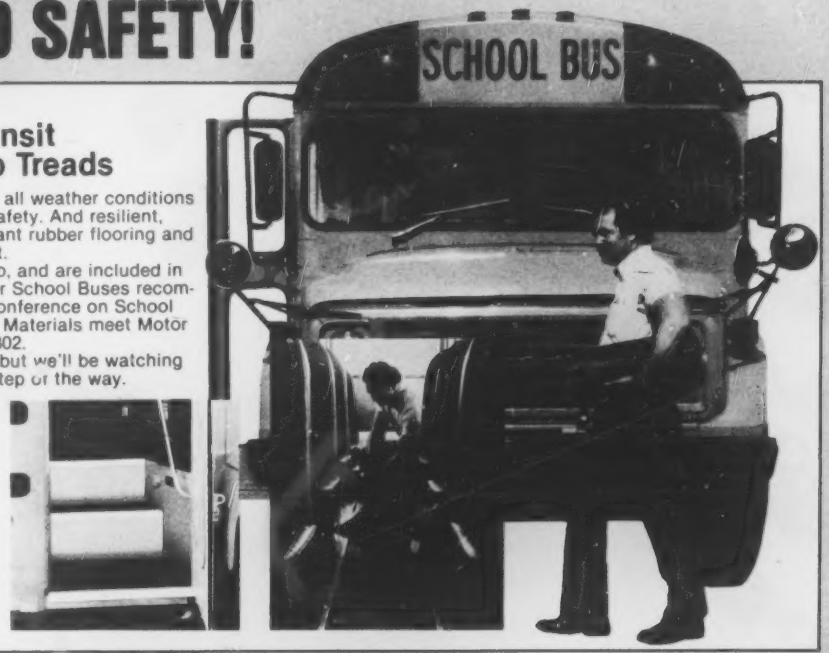

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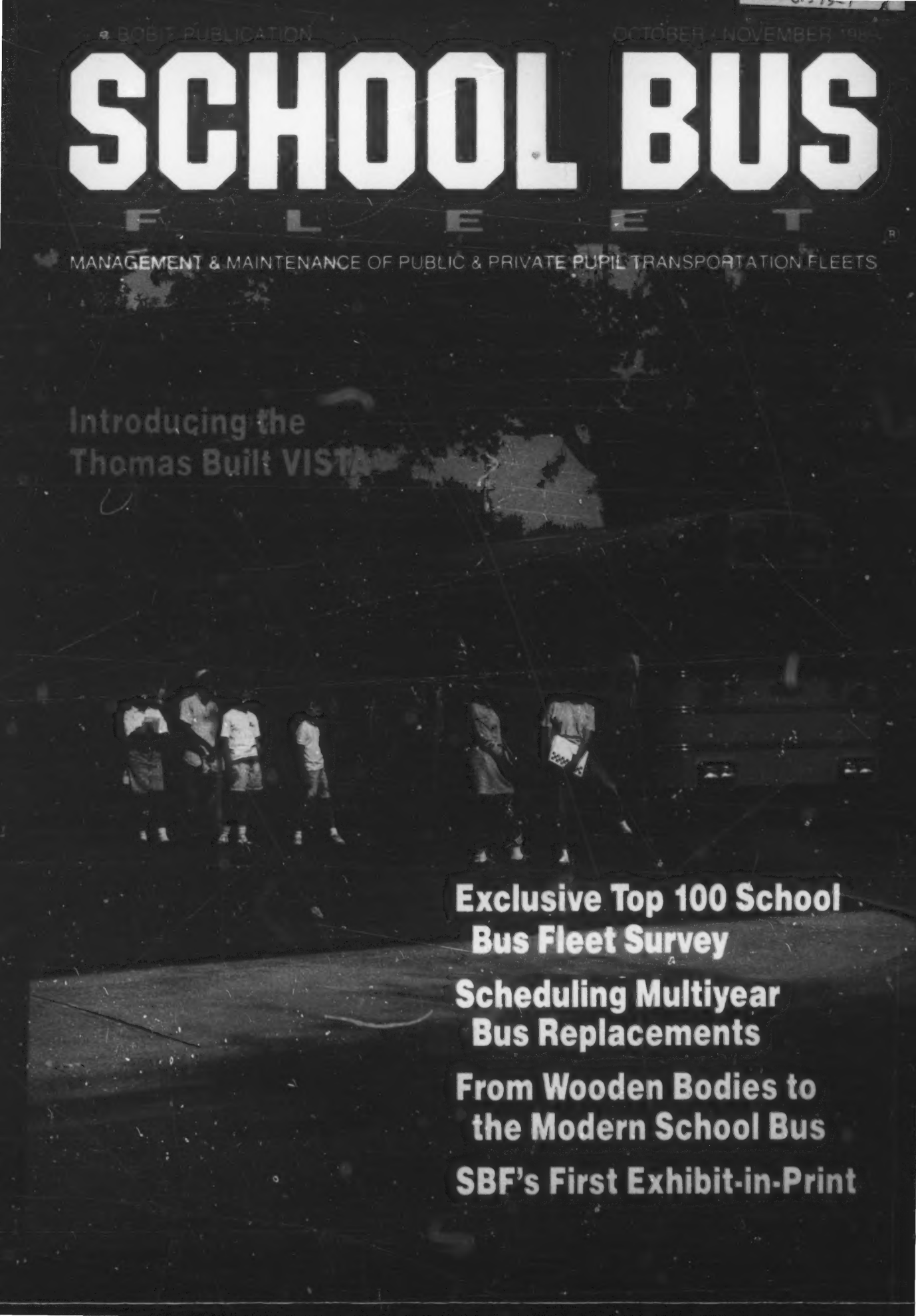
SCHOOL BUS FLEET

MANAGEMENT & MAINTENANCE OF PUBLIC & PRIVATE PUPIL TRANSPORTATION FLEETS



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SCHOOL BUS FLEET

MANAGEMENT & MAINTENANCE OF PUBLIC & PRIVATE PUPIL TRANSPORTATION FLEETS

Vol. 35 No. 5

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JESSE H. NEAL CERTIFICATE, 1985

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Survey Finds 100 Largest School Bus Fleets

The fifth annual survey of the Top 100 fleets reflects the emergence of the Big Four contractor firms, and robust activity among school district fleets nationwide.

The Top 100 school bus fleets in the United States and Canada own and operate slightly less than one quarter of the total fleet of school buses in service. That is according to the 1989 ***SCHOOL BUS FLEET*** Top 100 Fleet Survey.

Rankings are made according to *total fleet size*, that is the sum of both large school buses, i.e. conventional style and transit style, and small school buses, i.e. van and handicap rated at 10,000 lbs. GVW. These figures are presented in the column titled, "Fleet Size, 1989 Fleet."

Results are presented separately according to industry segment. School district fleets are presented first and ranked against other school district fleets, followed by contractor fleets, also according to their ranking relative to other contractor fleets. No attempt was made to rank the two segments against each other. The reason for this duality is simply that many of the fleets reported by school districts are actually contracted fleets.

Our primary objective was to find 100 fleets, not a predetermined number of fleets from each segment. Thus, the 100th fleet reported turns out to be a contractor fleet; it operates 148 school buses. Having reached the 100th fleet we eliminated all other respondents. Altogether, the survey ended up with 66 school district fleets and 34 contractor fleets.

Obviously, 100 percent of the buses in the contractor fleets are under contract to school districts somewhere, though not exclusively to the school districts reported herein. Altogether, the 34 contractors report operating 2,288 separate contracts with school districts, ranging from 718 by Laidlaw down to one for several companies.

Further, the data shows that of the 66 school districts in the survey, 26 districts report contracting 16,120 school buses or 61.5 percent of their fleets.

The identification of contract buses in district fleets needs to be kept in mind to understand other data. For example, contractors report carrying 2,934,374 pupils daily, one way. Meanwhile, school district respondents report carrying 2,370,968 pupils daily, one way. Some of those are the same students.

Because of the Canadian ownership of the largest contractor, Laidlaw Transit, we decided to include Canadian fleets this year. As a result, several all-Canadian companies are reported for the first time this year, too.

Laidlaw's totals are actually reported twice, once for its larger U.S.-based fleet and a second time for its smaller Canadian-based fleet. Altogether, the two Laidlaw fleets total 21,521 school buses.

That distinction was also made in the case of Charterways Transportation (in Canada) and National School Bus Service (in the United States), which are both owned by a Canadian conglomerate.

Another significant item is the number of school buses both segments expect to buy during the coming school year. That data is unadulterated, that is, school districts only reported buses their district will acquire *and own* since they have no way of knowing what their contract operators may acquire.

Fully 80 percent of all respondents plan to acquire (or are in the process of acquiring) new school buses for the 1989-90 school year. Thus, 49 school districts plan to acquire 2,309 school buses, while 30 contractors plan to acquire 6,114 school buses for the 1989-90 school year. These totals represent only new bus procurements among contractors and not growth that may occur as a result of future acquisitions of other contractor companies.

This latter fact had a bearing on survey results in other ways, however. At least three contract fleets believed to be large enough to qualify for the Top 100 ranking declined to provide information about their fleet size for fear of sparking interest in their company from among other acquisition-minded contractors.

One trend that has appeared since ***SCHOOL BUS FLEET*** began these surveys is the emergence of the Big Four national contracting firms: Laidlaw Transit, Ryder Student Transportation, Mayflower Contract Services and National School Bus Service. In the mid-Eighties only two of these companies, then both under different ownerships, existed. The Big Four are followed closely by half a dozen regional firms, some of which are known to have national aspirations.

One final note. Seventeen fleets, including ten contractor companies (counting Laidlaw as a single entity) and seven school districts, operate fleets of 1,000 or more school buses.

Editor's note: If your fleet was omitted from this year's survey, please send a note to that effect to Top 100 Fleet Survey, **SCHOOL BUS FLEET** *Magazine, 2512 Artesia Blvd., Redondo Beach, CA 90278.*

Largest 100 School Bus Fleets

'89	District Listing	Large Bus	Small Bus	Pupils Daily	Percent Contracted	1989 Fleet	± Over 1988
1	New York City Board of Education New York City, N.Y.	1963	1286	136,000	100	3249	+574
2	LA Unified School District Los Angeles, Calif.	2895		60,000	46	2895	+264
3	Chicago Public Schools Chicago, Ill.	1875	1015	44,000	100	2890	+195
4	Milwaukee Public Schools Milwaukee, Wis.	1150	450	57,000	100	1600	+400
5	Fairfax County School District Alexandria, Va.	972	255	95,000		1227	+59
6	Dallas County Schools Dallas, Tex.	729	387	46,000		1166	+116
7	Philadelphia School District Philadelphia, PA	864	190	33,000	1	1054	+45
8	Prince Georges County School District Upper Marlboro, MD	727	262	74,125		989	+116
9	Houston Independent School District Houston, Tex.	619	353	37,000		972	+95
10	Dade County Public Schools Miami, Fla.	965	5	55,000		970	+230
11	Montgomery County School District Rockville, Md.	898		64,000		898	+14
12	Jefferson County School District Louisville, Ky.	647	235	64,000	19	882	+86
13	Hillsborough County School District Tampa, Fla.	726	120	67,000		846	-1
14	Hawaii Department of Education Honolulu, Hi.	504	235	39,000	98	793	+38
15	Charlotte Mecklenburg School District Charlotte, N.C.	759		51,000		759	+84
16	Duval County School District Jacksonville, Fla.	520	222	50,000	100	742	+68
17	Minneapolis Public Schools Minneapolis, Minn.	540	151	40,914		691	+209
18	Detroit Public School District Detroit, Mich.	535	150	25,000		685	+15
19	Wake County Public Schools Raleigh, N.C.	574	105	40,000		679	-71
20	Baltimore County School District Baltimore, Md.	412	226	49,000	5	673	+122
21	Cobb County Public Schools Marietta, Ga.	494	161	53,000		655	+170
22	Boston Public School District Boston, Mass.	381	271	27,000	100	652	+182
23	East Baton Rouge Public Schools Baton Rouge, La.	561	86	45,000		647	-8
24	DeKalb County Public Schools Tucker, Ga.	525	100	55,000		625	+120
25	Dept. Elementary & Secondary Education St. Louis, Mo. (Voluntary Desegregation)	479	124	14,000	100	603	+233

Largest 100 School Bus Fleets

'89	District Listing	Large Bus	Small Bus	Pupils Daily	Percent Contracted	1989 Fleet	± Over 1988
26	San Diego Unified School District San Diego, Calif.	384	199	30,000	50	583	+36
27	Gwinnett County Public Schools Lawrenceville, Ga.	461	104	58,000		565	+50
28	Columbus Public Schools Columbus, Ohio	552		N/A		552	-78
29	Austin Independent School District Austin, Tex.	305	233	22,000		538	+20
30	Virginia Beach City Public Schools Virginia Beach, Va.	417	104	56,000		521	0
31	Cleveland City Schools Cleveland, Ohio	400	100	35,000		500	+103
32	Prince William Co. Public Schools Bristow, Va.	357	125	20,500		482	+39
33	Omaha School District Omaha, Neb.	162	310	14,000	34	472	0
34	Caddo Parish School District Shreveport, La.	360	100	30,000		460	+54
35	Metro Nashville Public Schools Nashville, Tenn.	335	120	46,000		460	0
36	Clark County School District Las Vegas, Nev.	315	142	32,000		457	+23
37	Denver Public Schools Denver, Colo.	325	100	25,000		425	+36
38	School Board of Brevard County Rockledge, Fla.	360	55	28,000		415	+42
39	Albuquerque Public Schools Albuquerque, N.M.	269	140	32,540	100	409	+17
40	Cypress-Fairbanks ISD Houston, Tex.	361	43	N/A		404	+21
41	Buffalo Public School District Buffalo, N.Y.	307	95	22,387	97	402	+54
42	Seattle Public Schools Seattle, Wash.	290	110	20,000	100	400	0
43	LA County Office of Education Downey, Calif.	120	280	4,000	100	400	-27
44	Portland Public Schools Portland, Ore.	230	170	15,000	85	400	+60
45	Fort Worth Public Schools Ft. Worth, Tex.	332		17,000		332	+4
46	Memphis Public Schools Memphis, Tenn.	181	150	20,000	100	331	-18
47	Jefferson Parish Public Schools Harvey, La.	328		50,000	100	328	-59
48	Pasco County Schools Port Richey, Fla.	243	84	22,000		327	+27
49	St.Louis Public Schools St. Louis, Mo.	250	70	14,500	6	320	-30
50	Knox County Dept. of Public Instr. Knoxville, Tenn.	260	57	34,310	100	317	+3

Largest 100 School Bus Fleets

RANK	SCHOOL DISTRICT/CITY	FLEET MIX				FLEET SIZE	
'89	District Listing	Large Bus	Small Bus	Pupils Daily	Percent Contracted	1989 Fleet	± Over 1988
51	St. Paul Public Schools St. Paul, Minn.	297	3	29,000	99	300	-15
52	Spec. School District of St. Louis St. Louis, Mo.	292		6,000		292	+14
53	Anchorage Public Schools Anchorage, Alaska	191	86	18,000	69	277	+155
54	Jefferson County Public Schools Lakewood, Colo.	270	3	19,000		273	+11
55	Rockford Public Schools Rockford, Ill.	189	92	17,500	10	272	+53
56	Oklahoma City Public Schools Oklahoma City, Okla.	173	92	30,000		265	+6
57	Long Beach School District Long Beach, Calif.	164	81	22,000	98	245	+1
58	Tucson Unified School District Tucson, Ariz.	186	59	29,000		245	0
59	Richmond Public Schools Richmond, Va.	231		22,000		231	0
60	Ector County School District Odessa, Tex.	215	12	8,000		227	+34
61	Mesa School District Mesa, Ariz.	141	78	17,000		219	+23
62	Orleans Parish Public Schools New Orleans, La.	125	90	90,000		215	-85
63	Kanawha County Schools Charleston, W.Va.	204		23,000		204	+22
64	Washoe County School District Sparks, Nev.	138	56	12,000		194	+18
65	San Juan School District Carmichael, Calif.	118	56	13,000		174	-9
66	Franklin County School Columbus, Ohio	114	35	2,000		149	+24
RANK	SCHOOL BUS CONTRACTORS	FLEET MIX				FLEET SIZE	
'89	Contractor Listing	Large Bus	Small Bus	Pupils Daily	Number of Contracts	1989 Fleet	± Over 1988
1	Laidlaw Transit Inc. (U.S.) Van Nuys, Calif.	12579	5165	877,670	710	17671	+3238
2	Ryder Student Transportation Miami, Fla.	6000	1500	320,000	210	7500	+2900
3	Mayflower Contract Services Shawnee Mission, Kan.	3600	600	230,000	220	7500	+2300
4	Laidlaw Transit Ltd. (Canada) Burlington, Ontario, Canada	3508	172	179,784	109	3680	N/A
5	National Schoolbus Service Palatine, Ill.	2430	570	315,000	200	3000	+75
6	Vancom Incorporated South Holland, Ill.	1420	590	210,000	145	2010	+501
7	Durham Transportation Rosemead, Calif.	905	617	45,000	70	1522	+366
8	Charterways Transportation London, Ontario	1260	200	70,000	42	1460	+60
9	Atlantic Express, Inc. Staten Island, N.Y.	1205	225	70,000	50	1430	N/A
10	Cook-Illinois Corporation Oak Forest, Ill.	750	450	N/A	56	1200	0

Largest 100 School Bus Fleets

RANK	SCHOOL BUS CONTRACTORS	FLEET MIX				FLEET SIZE	
'89	Contractor Listing	Large Bus	Small Bus	Pupils Daily	Number of Contracts	1989 Fleet	± Over 1988
11	Transcomm Inc. Methuen, Mass.	400	600	30,000	47	1000	N/A
12	All Way Transportation Scarborough, Ontario	269	638	21,200	13	907	N/A
13	School Services & Leasing, Inc. Edwardsville, Kan.	573	256	73,000	14	829	+170
14	Mark IV Charter Lines Gardena, Calif.	590	245	40,000	35	835	N/A
15	Willett Motor Coach Chicago, Ill.	435	315	N/A	24	750	0
16	Jetco Wisconsin, Inc. Waukesha, Wis.	523	120	40,000	17	743	+18
17	Towne Bus Company Hicksville, N.Y.	305	415	42,000	20	720	
18	Stockway Transportation Richmond Hill, Ontario	450	200	25,300	14	650	+150
19	Septran Inc. Bloomington, Minn.	130	520	18,000	9	650	N/A
20	Suffolk Transport Services, Inc. Bayshore, N.Y.	200	250	35,000	7	450	0
21	Robinson Bus Service Evanston, Ill.	400	50	18,000	15	450	+80
22	George Krapf Jr. & Sons, Inc. Glenmoore, Penn.	300	140	36,000	6	440	+39
23	Briggs Bus Lines Edmonton, Alberta	275	100	15,000	7	375	0
24	Logan Bus Company Ozone Park, N.Y.	180	170	4,400	6	350	0
25	LAG Industries Corp. Jamaica, N.Y.	350		30,000		350	N/A
26	Simcoe Transit Co. Oshawa, Ontario	200	140	10,000	8	340	N/A
27	Stewart Bus Company Chicago, Ill.	225	90	5,500	2	315	+5
28	Medicine Lake Bus Company St. Paul, Minn.	235	35	17,500	12	270	N/A
29	Special Transportation, Inc. Lansing, Mich.	119	133	3,800	21	252	-24
30	Rifeway Bus Service, Inc. Richfield, Wis.	150	75	12,000	5	225	+25
31	Huntington Coach Corp. Huntington Station, N.Y.	155	45	19,720	7	200	+12
32	Action Transit Enterprise, Inc. Pittsburgh, Penn.	110	80	12,000	4	190	-80
33	New York Bus Service Bronx, N.Y.	161		N/A	1	161	170
34	Kobussen Buses, Ltd. Kaukauna, Wis.	115	33	5,000	5	148	N/A

Rust Nags School Buses

California survey points out problems that may be nationwide.

It tends to sneak up on you. Sooner or later, it will attack your school bus. It's certainly costly. It can be dangerous. It is any of various scaly or powdery reddish-brown or reddish-yellow hydrated ferric oxides formed in the presence of water.

Rust.

How prevalent is it? Quite prevalent, according to a recent survey on rust and water damage to school bus fleets. Even if your buses are in the desert.

The survey was conducted by the Humboldt County Office of Education in Northern California. Barney Finlay, director of business services for the office, said rust ". . . is a very serious problem statewide, not just in rainy areas, and action needs to be taken . . . It is our hope that these survey results will help to support efforts to correct design or manufacturing deficiencies in this area."

The survey was mailed to 750 school bus contractors and school districts in California, virtually blanketing the state. There were 163 respondents, about 22 percent; they operate 4,177 school buses, about 31 percent of the estimated buses in operation.

Fifty-four percent of the respondents said rust is in plain sight on their buses, and 55 percent suspect hidden rust. Thirty-two respondents have had 70 buses decertified in the past three years due to rust. California law requires school buses to be "reasonably watertight."

Seventy-two respondents had to make repairs to their fleet because of water leaks or rust; that cost more than $1 million in actual repairs and $100,000 in loss of bus use.

Number of Responses to Water Leak Locations

	Transit	Conventional	Van Conversion
Front Top	36	31	26
Center Top	6	42	24
Rear Top	19	7	26
Doors	28	43	50
Side Windows	28	27	19
Windshield	97	37	29
Side Panels	15	6	9
Floor Area	17	19	3
Other Areas	23	2	4

Dan Pires, Humboldt's transportation supervisor, said, "Our survey gives us an accurate picture of the state. The problem is nationwide if California is an example, because the vehicles are made all over."

Under the skin

Pires said the biggest problem is that water gets between the inner and outer skin, the insulation gets soaked and stays wet for three weeks. "We want to pressure the manufacturers to correct this," Pires said. He said some bus manufacturers galvanize body bows and inner and outer skins, but rust still gets in because welds rusted out.

Pires noted that one bus manufacturer has used a different sealing process for three years that is effective. He said that most leaks are from roof seals, and one manufacturer uses six-inch rubber tape for heat-sealing the seams. The tape "runs" and makes a good seal, Pires said.

The survey also showed that:

- 19 percent of the respondents reported rust before the bus was one year old; 24 percent in one to five years; 35 percent in five to 10 years; 12 percent in 10 to 15 years; and 10 percent in buses older than 15 years.
- Of the small number of respondents who made a request for help, seven rated dealers "very helpful," five rated manufacturers "very helpful"; 16 rated dealers "helpful," 9 rated manufacturers "helpful"; 32 rated dealers "no help," 36 rated manufacturers "no help."

Business Services Director Finlay said, "While our primary concern is safety, another consideration is the nuisance factor of drivers that have to wear rain gear inside the bus or seats that can't be used by pupils unless they have an opened umbrella. We can build a better bus."